meter coil, it ought to have been so, because then the intensity is lower and the lateral transmission less.

102. Hence it would appear that *if the same absolute quantity of electricity pass through the galvanometer, whatever may be its intensity, the deflecting force upon the magnetic needle is the same.*

103. The battery of fifteen jars was then charged by sixty revolutions of the machine, and discharged, as before, through the galvanometer. The deflection of the needle was now as nearly as possible to the eleventh division, but the graduation was not accurate enough for me to assert that the arc was exactly double the former arc; to the eye it appeared to be so.

The probability is, that *the deflecting force of an electric current is directly proportional to the absolute quantity of electricity passed,* at whatever intensity that electricity may be.[1]

104. Dr. Ritchie has'shown that in a case where the intensity of the electricity remained the same, the deflection of the magnetic needle was directly as the quantity of electricity passed through the galvanometer'[2] Mr. Harris has shown that the *heating* power of common electricity on metallic wires is the same for the same quantity of electricity whatever its intensity might have previously been.[3]

105. The next point was to obtain a *voltaic* arrangement producing an effect equal to that just described (103). A platina and a zinc wire were passed through the same hole of a draw-plate, being then one-eighteenth of an inch in diameter; these were fastened to a support, so that their lower ends projected, were parallel, and five-sixteenths of an inch apart. The upper ends were well connected with the galvanometer wires. Some acid was diluted, and, after various preliminary experiments, that adopted as a standard which consisted of one drop strong sulphuric acid in four ounces distilled water. Finally, the time was noted which the needle required in swinging either from right to left or left to right: it was equal to seventeen beats of my watch, the latter giving one hundred and fifty in a minute.

The object of these preparations was to arrange a voltaic appa-ratus, which, by immersion in a given acid for a given time, much less than that required by the needle to swing in one

[1] The great and general value of the galvanometer, as an actual measure

of the electricity passing through it, either continuously or interruptedly, must be evident from a consideration of these two conclusions. As constructed by Professor Ritchie with glass threads (see *Philosophical Transactions,* 1830, p. 218, and *Quarterly Journal of Science,* New Series, vol. i. p. 29), it apparently seems to leave nothing unsupplied in its own department.

[2] *Quarterly Journal of Science,* New Series, vol. i. p. 33.

[3] *Plymouth Transactions,* p. 22.